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ABSTRACT

This report contains a secondary school curriculum guide designed to be used by vocational teachers in a one- or two-year recreational vehicle maintenance/repair program. In the preliminary pages, a description is given of the project that developed the curriculum, outlining its objectives and procedures in formulating the model interdisciplinary course. The curriculum is composed of the following components: (1) orientation to the trade; (2) the use of tools and equipment; (3) LPG systems and their assembly, testing, regulating, filling, and maintenance; (4) hitching and towing; (5) running gear, such as suspension systems, wheels and tires, and brakes; (6) electrical power; (7) plumbing; (8) construction, both supporting and exterior; (9) appliance repair, including refrigerators, air conditioning, stoves, ovens, and hot water heaters; (10) automotive systems, covering ignitions, fuel systems, engines, and cooling systems; (11) accessory installation of television antennas and air conditioners; (12) auxiliary power operation, maintenance, and installation; (13) pre-delivery service; and (14) management of sales and service areas. Each component consists of one or more units for which student objectives, classroom topics, and learning activities are listed. A cooperative education program with industry is suggested to complement the course work. Also included is a student progress chart to record a student's achievement of specific objectives. (This curriculum is to be tested for one year and then amended for publication in final form.) (ELG)

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#SCDG032

ED164832

MAY 3 1979

REPORT

OF

A VOCATIONAL PROGRAM FOR RECREATIONAL VEHICLE MAINTENANCE/REPAIR

1977-78

Ocean County Vocational-Technical School
Old Freehold & Bey Lea Roads
Toms River, New Jersey 08753
201-240-6414

U S DEPARTMENT OF HEALTH,
EDUCATION & WELFARE
NATIONAL INSTITUTE OF
EDUCATION

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Project Director
Robert Newman
Assistant Superintendent

CE 018 697

This project reported herein was conducted pursuant to a contract from the New Jersey Department of Education, Division of Vocational Education. It was funded under Section D of Public Law 94-482.

Project Duration:

October 13, 1977
Beginning Date

June 30, 1978
Ending Date

The Contractors undertaking this project were encouraged to express fully their judgments in professional and technical matters. Points of view or opinions do not, therefore, necessarily represent official funding agency positions or policies.

ABSTRACT

PROJECT TITLE A Vocational Program for Recreational Vehicle Maintenance/Repair Personnel

LEGAL NAME OF DISTRICT OR INSTITUTION

Ocean County Vocational-Technical School

ADDRESS Old Freehold & Bay Lea Roads, Toms River, New Jersey 08753

PROJECT DIRECTOR Mr. Robert C. Newman (Name) Assistant Superintendent (Title)

TELEPHONE NO. 201-240-6414 (Area Code)

FUNDED UNDER SECTION D OF P. L. 94-482 PROJECT BUDGET $ 19,794.00

PROJECT OBJECTIVES

1. To create a curriculum for a new innovative program- Recreational Vehicle Maintenance/Repair.
2. To create the Recreational Vehicle Maintenance/Repair curriculum as a multidisciplinary curriculum.
3. To create a curriculum acceptable to the Recreational Vehicle Industry.
4. To create a curriculum which gives the student a more varied opportunity on the job market.
5. To create a curriculum which will insure the student competence in the field of Recreational Vehicle Repair.
6. To create a curriculum detailed enough to be of use not only to the originating school, but also to all other interested schools which have not had the familiarity with the program.

PROCEDURES FOLLOWED

1. Curriculum research - essentially indicated no programs in existance.
2. Advisory Committee was formed consisting of industry members, vocational administrators, and Curriculum Laboratory Director.
3. Curriculum consultant and course instructor were hired.
4. The instructor and consultant met at regular intervals and formulated the curriculum.
5. The content of the course was presented and approved by the Advisory Committee.

PROCEDURES TO BE FOLLOWED AS OF SEPTEMBER 6, 1978

1. Curriculum is to be the foundation for the teachers guide. It is, however, an interim curriculum to be tested for one year. It will be amended as needed.

2. The curriculum will be followed in class and laboratory.
3. A permanent curriculum will be formulated after one years trail.
4. The permanent curriculum will be published by the Curriculum Laboratory.

STATE AND LOCAL PRIORITIES

1. The need to train for an industry important in Ocean County.
   a. Preparation and service of recreational vehicles sold in Ocean County.
   b. Maintenance and repair of recreational vehicles which visit Ocean County.
   c. Maintenance and repair of living units in the closely related mobile home parks in Ocean County.
2. The need to train for an industry growing in importance in New Jersey.

CONTRIBUTION TO VOCATIONAL EDUCATION

1. This new program will add a new innovative curriculum to state vocational offerings.
2. This new program will increase vocational enrollment.
3. This new program will enhance vocational education ability to service New Jersey industry.
4. This new program will enhance vocational education placement capabilities
5. This new and innovative program will enhance the prestige of Vocational Education in New Jersey.

ACKNOWLEDGEMENTS

Developing this program in Recreational Vehicle Maintenance/Repair required the efforts of many individuals. The concept, need and scope originated with Benjamin Shapiro, (Retired) Director of the New Jersey Vocational-Technical Curriculum Laboratory at Rutgers. I am grateful to him and to Fred Cappello, Director of Vocational Curriculum and Media Development, Division of Vocational Education.

I would like to thank the Ocean County Vocational-Technical School Board of Education for their continuing support of this program. I am grateful to Mr. William Henry, Superintendent of the Ocean County Vocational-Technical School for his enthusiastic support and to Mr. Robert Newman who developed the funding proposal and directed this project.

Many thanks are extended to those of the Recreational Vehicle Industry who gave of their valuable time to this project. Our Advisory Committee provided considerable input in the content and structure of this curriculum.

For his supportive help, I would like to thank Mr. George Samson, Principal of the Jackson Center. I would also like to thank Patricia England for her many contributions to the composition of this curriculum.

Lastly, I would like to express my many thanks to Judy Riggleman who evolved notes into clear typed copy.

Ken Sanford
Instructor

State of New Jersey
Department of Education
Division of Vocational Education

A Recreational Vehicle Maintenance/Repair Mechanic Curriulum

Interim Curriculum

For Study And Discussion

William Henry, Superintendent
Ocean County Vocational-Technical School

Robert Newman, Assistant Superintendent
Ocean County Vocational-Technical School

Ken Sanford
Ocean County Vocational-Techncial School

Ben Shapiro
Consultant to the Project

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INTRODUCTION

PROBLEM

The consistant increase in leisure time activities has created a multimillion dollar industry dealing with the manufacture, repair and maintenance of recreation vehicles. Vehicles ranging in complexity from a simple tent trailer to an elaborate self-propelled home on wheels must be effectively serviced and maintained to insure efficiency, safety and equitable investment return to the purchaser. Owners of such vehicles are often confronted with the lack of trained personnel providing needed service maintenance and repair work. Ineffective maintenance of recreational vehicles can result in hazardous conditions.

While we realize the importance of maintaining the power train we are primarily interested in the so called residential aspects of this house on wheels. Specifically, to make a vehicle livable there are included such things as sanitary facilities, showers, cooking ranges, lighting systems, climate control and more. When we look more closely at the above amenities we realize that a maintenance mechanic skilled in total maintenance would need to know some plumbing, electricity, air conditioning, refrigeration, woodworking and sheet metal work. Thus we can visualize a person already in mechanical maintenance adding some more appropriate skills and we come to our interdisciplinary curriculum which can be taught in most vocational programs within a vocational technical school system which has traditionally fostered the unitary approach of teaching occupations.

It is not suggested that all disciplinaries be treated exhaustively, but that there be excerpted from each those skills appropriate to Recreational Vehicle Maintenance/Repair.

Let us see a small sample of what a student may learn:

From Plumbing

- RV Plumbing Joints
- RV Plumbing Valves
- RV Fresh Water Systems
- RV Drainage Systems
- RV Toilet Systems
- RV Plumbing Winterization

From Electricity

- Low Voltage
- Automotive Battery
- RV Power Convertor
- Domestic AC Voltage

From Automotive

- Fuel SYstem
- Ignition System
- Cooling System
- Lubrication System

From Auto Body

- Fiberglass Repair
- Sheet Metal Repair
- Spray Painting

With such a curriculum we can reasonably expect to develop a well rounded, versatile technician who can fill a growing need.

PROJECT OBJECTIVES

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2. To create the Recreational Vehicle Maintenance/Repair curriculum as a multi-disciplinary curriculum.
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5. To create a curriculum which will insure the students competence in the field of Recreational Vehicle Maintenance/Repair.
6. To create a curriculum detailed enough to be of use not only to the originating school, but also to all other interested schools which have not had the familiarity with the program.

PROCEDURES FOLLOWED

1. Curriculum research essentially indicated no programs in existance.
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FINDINGS

Industries Need For The Program

Presently there is no formal training available for Recreational Vehicle Maintenance/Repair Mechanics in a secondary school. For this reason, industry does not have an opportunity to locate pretrained employees. Since education is not a prime concern of industry, it sometimes may be neglected. There are various seminars available to industry, but they are very time consuming as well as expensive to the employer. Because of these reasons employers are sometimes hesitant to hire the untrained secondary graduate.

Thus an opportunity presents itself to the vocational school, to take on the responsibility of a vital and sadly neglected training program. In effect this totally new program makes it possible for the school to supply a need and upgrade the quality of workmanship in a growing field.

INTRODUCTION TO CURRICULUM

The curriculum for the Recreational Vehicle Maintenance/Repair Program was developed to create a model curriculum which which would allow students to major in an occupational field not presently available. It is a trailblazing effort for this reason. It is also innovative because it is organized as a multidisciplinary curriculum, wherein the student is assigned to several different disciplines from which he gathers a wide range of basic skills and knowledge, all applicable to the work of a maintenance mechanic for Recreational Vehicles.

Students enrolled in the Recreational Vehicle Maintenance/Repair Program will rotate with their instructor through existing vocational facilities. Educational activities have been developed to cultivate those skills needed for work in the Recreational Vehicle Industry. Students who are capable and desire work in the Recreational Vehicle Industry will be encouraged to participate in the Cooperative Industrial Educaion Program. Student placement support will also be provided at the conclusion of the program by the coordinator for job placement services.

ORIENTATION COMPONENT

Unit I Orientation To The Trade

ORIENTATION COMPONENT OBJECTIVES

1. Students will acquire a realistic knowledge of the Recreational Vehicle Industry, its success and future, and be able to discuss it. They will be able to pass a test devised to prove their knowledge of the industry.

2. Students will be able to identify several Recreational Vehicle Types. They will be able to advise a consumer as to the advantage and disadvantage of each type.

3. Students will be able to identify situations that contirbute to a safety hazard and take preventative measures regarding safety hazards.

Unit I - Orientation to the Trade

SPECIFIC OBJECTIVES

1. Students will acquire a realistic knowledge of the Recreational Vehicle Industry, its success and future, and be able to discuss it. They will be able to pass a test devised to prove their knowledge of the industry.
2. Students will be able to identify several Recreational Vehicle types. They will be able to advise a consumer as to the advantages and disadvantages of each type.
3. Students will be able to identify situations that contribute to a safety hazard and take preventative measures regarding safety hazards.
4. Students will be able to maintain the shop as a safe place to work exercising protective procedures for personal safety.
5. Students will be able to exercise safety in the use of hand tools and equipment.
6. Students will be able to investigate and report accidents properly.

TOPICS

A. Orientation of the Trade
B. Type Identification
C. Shop Safety

Classroom	Activities
A. Orientation to the Trade 1. Description of the trade 2. Requirements for success 3. Future of the trade a. future of the vehicle b. future of the mechanic c. future of wages	Students will visit an operating RV Shop showing job types and vehicle types
B. Type Identification 1. Tent Camper 2. Travel Trailer	Students will identify the various types of common recreational vehicles Students will identify the major advantages and disadvantages of each type

3. Fifth Wheels

4. Motor Homes Class A

5. Motor Homes Class B

6. Motor Homes Class C

Students will be able to identify the price range of the various types of recreational vehicles

C. Shop Safety

1. Accidents and accident prevention

   a. Causes of accidents

   b. Accident prevention

   c. Accident prevention and safety programs in industry

   d. Accident prevention as a responsibility of all

   e. Importance of proper conduct and attitude

   f. Dangers in horseplay and carelessness

2. Making the shop a Safe place to work

   a. Shop layout

   b. Painting

   c. lighting

   d. Ventilation

   e. Floors

   f. Fire prevention and drills

   g. Sanitation and personal hygiene

3. Maintaining a Safe place to Work

   a. Housekeeping

      (1) floors

Students will identify situations that will contribute to a safety hazard

(2) stairs

(3) loose objects

(4) materials

(5) rags and waste

(6) lockers and cabinets

b. Storage of tools

c. Storage of materials and supplies

d. Shop cleanliness

e. Dust, fumes and gases

f. Electrical hazards

4. Personal Protective Devices

a. Eye protection

b. Protective clothing

c. Foot protection

d. Respirators

5. Hand and Portable Tool Safety

a. Use of correct tools

b. Correct use of tools

c. Defective tools

d. Hazards in use of specific tools

e. Portable electric hand tools

f. Pneumatic tools

6. Accident Investigation and Reporting

a. First Aid

b. Accident Reports

TOOLS AND EQUIPMENT COMPONENT

Unit I Using Common Tools

TOOLS AND EQUIPMENT COMPONENT OBJECTIVES

1. Students will be able to select and safely use various tools and equipment common to the Recreational Vehicle Industry.

2. Students will demonstrate their ability to maintain tools and equipment in the proper manner.

Unit I - Using Common Tools

SPECIFIC OBJECTIVES

1. Students will be able to safely use various tightening tools.
2. Students will be able to safely use various driving tools.
3. Students will be able to safely use various cutting tools.
4. Students will be able to safely use various types of hole making tools.
5. Students will be able to safely use various flaring tools.
6. Students will be able to safely use various power hand tools.
7. Students will be able to safely use various types of bench tools.
8. Students will be able to safely use various types of common fasteners.
9. Students will be able to maintain various tools common to the RV Industry.

TOPICS

A. Hand Tools
B. Power Hand Tools
C. Bench Power Tools
D. Common Fasteners

Classroom	Activities
A. Demonstrate and discuss the safety and use of hand tools	Students will practice the use of each tool to exhibit safe and proper use
1. Tightening Tools	Students will practice proper selection and size of tools
a. wrenches	
b. pliers	Students will illustrate understanding of safe tool condition
c. screwdrivers	
2. Driving Tools	
a. hammers	
b. mallots	
3. Cutting Tools	
a. saws	
b. chisels	
c. carpet knife	
d. metal shears	

4. Hole Making Tools
    a. punches
    b. awls
    c. drill bits
5. Flaring Tools
    a. tubing cutters
    b. flare tool
    c. double flare tools

B. Demonstrate and discuss the safety and use of power hand tools
    1. Pistol grip 3/8", 1/2" drill
    2. Spade Handle 1/2" drill
    3. Dual action sawsall

C. Demonstrate and discuss the safety and use of bench power tools
    1. Bench saws
    2. Bench grinder
    3. Drill press

D. Demonstrate and discuss the types of common fasteners. When and how to use them
    1. Bolts, nuts, washers
    2. Assorted screws
    3. Nails
    4. Pop rivets
    5. Cotter keys and pins
    6. Adhesives

Students will select the proper type and size of suitable fastener

LPG COMPONENT

Unit I	Compressed Gas
Unit II	Operation of the LPG Assembly
Unit III	Testing LPG System
Unit IV	Assembly of the LPG System
Unit V	LPG Regulator
Unit VI	Filling the LPG System
Unit VII	Replacement of POL Valve from a Vertical Cylinder

LPG COMPONENT OBJECTIVES

1. Students will demonstrate their understanding the safety and hazards of LPG.

2. Students will recognize several types of LPG regulators and containers.

3. Students will be able to test the LPG system by using various methods.

4. Students will be able to install LPG single and double tank installations.

5. Students will demonstrate their understanding of the LPG regulating system.

6. Students will be able to safely fill a LPG cylinder using various methods.

7. Students will be able to remove and replace a POL valve from a vertical sylinder.

Unit I - Compressed Gas

SPECIFIC OBJECTIVES

1. Students will demonstrate their understanding of the compression and flammability of LPG.
2. Students will be able to recognize unsafe conditions and practice safety procedures for the use of LPG.

TOPICS

A. Properties of Compressed Gas
B. Safe Handling of Compressed Gas

Classroom	Activities
A. Properties of Compressed Gas 1. Define compressed gas 2. Discuss the properties of compressed gas 3. Explain and discuss the dangers of compression	Students will demonstrate compression, over compression and the flammability of LPG
B. Safe Handling 1. Discuss the condition of container 2. Explain the capacity of container 3. Explain proper filling 4. Discuss transporting the container 5. Discuss safe working conditions	Students will learn to recognize unsafe conditions and practice safety when using LPG

Unit II - Operation of the LPG Assembly

SPECIFIC OBJECTIVES

1. Students will be able to recognize different cylinders and their need.
2. Students will be able to identify types of LPG regulators.
3. Students will be able to identify the different parts of LPG containers.
4. Students will demonstrate their understanding of the LPG cylinder markings.

TOPICS

A. Types of cylinders
B. Types of regulators
C. Potential B.T.U.
D. Common Terms

Classroom	Activities
A. Types of cylinders	Students will inspect several types of LPG cylinders
1. Discuss the various types of LPG cylinders	
2. Explain the need for several styles of LPG cylinders and the materials used in their construction	
3. Discuss tank markings and their meaning	Students will identify various markings on the LPG cylinder and explain their meaning
B. Types of regulators	Students will inspect several types of LPG regulators and their functions
1. Explain and discuss the use of several types of LPG regulators and how their functions differ	
C. B.T.U. Potential	
1. Explain the potential B.T.U. capacity of several common LPG containers	Students will calculate the potential B.T.U.'s for a common container

2. Discuss B.T.U.'s

   a. per gallon

   b. per pound

   c. per cubic foot

D. Common terms of the LPG cylinder

Students will identify and demonstrate their understanding of the common LPG terms

   1. POL withdrawal service

   2. POL spud and nut

   3. POL fill valve

   4. 10-20% valve

   5. Vapor withdrawal tube

   6. Bottom ring

   7. Safety relief valve

   8. Visable guage

Unit II - Testing the LPG System

SPECIFIC OBJECTIVES

1. Students will be able to test the LPG system with soapy water and conclude the results.
2. Students will be able to test the LPG system with manometer and conclude the results.
3. Students will be able to use in line gas test with the LPG system.

TOPICS

A. Soapy Water Testing
B. Manometer Testing
C. In Line Testing

Classroom	Activities
A. Soapy Water Testing	
1. Present safety hazards associated with LPG leaks; flammability, explosivness	
2. Explain how to make a soapy water solution for testing	Students will prepare and use a soapy water solution to test for leakage
3. Emphasize the need of using proper tools when dealing with soft brass fittings	
B. Manometer Testing	Students will test the LPG system with a manometer
1. Discuss the proper tightening of brass fittings and valves	
2. Explain the proper use of a low pressure LPG guage	
C. In Line Testing	
1. Explain the workings of an in line test valve	Students will connect in line gase valve to the LPG assembly

2. Discuss the installation of an in line testing valve	Students will test gas fittings on the assembly using soapy water method
3. Review LPG testing methods	Students will observe the sight glass

Unit IV - Assembly of the LPG System

SPECIFIC OBJECTIVES

1. Students will be able to install both a single and double installation on a trailer frame.
2. Students will be able to use the proper method of joining the LPG system lines.

TOPICS

A. Mounting the Tanks
B. Securing Regulators
C. Attaching Gas Feed Hose to Feed and Regulator
D. Connecting POL to Regulator
E. Connecting POL to Cylinder
F. Testing Assembly

Classroom	Activities
A. Explain the need for and describe a safe, secure mounting of a LPG cylinder	Students will install both a single and double installation on frame
B. Explain the need for a properly installed LPG regulator 1. Danger from puncture 2. Freeze ups 3. Line chafing	Students will install single and double tanke assembly
C. Discuss proper methods of bending and joining copper and the proper use of high pressure hose brass fittings 1. Discuss the use of pipe sealers	Students will attache both single and double installation using copper and high pressure flexible hose. Students will attache both single and d double installation using manifold tee with copper and flexible POL pigtails
D. Emphasize the use of proper wrenches and sealers to have a safe LPG connection	Students will attach POL to cylinder using proper tools

1. Discuss handling of soft brass fittings

E. Review testing methods which would apply to a LPG cylinder installation

Students will perform the necessary tests

Unit V - LPG Regulator

SPECIFIC OBJECTIVES

1. Students will demonstrate their understanding the need for a low pressure LPG system.
2. Students will demonstrate their understanding the use of the double and single style regulators.
3. Students will be able to install and adjust an automatic change over regulator for proper operating pressure.
4. Students will demonstrate their understanding of regulator problems associated with LPG overfilling and condensation.
5. Students will be able to clear condensation from a LPG regulator.

TOPICS

A. Need for low pressure
B. Single stage regulator
C. Double stage regulator
D. Automatic change over regulator

Classroom	Activities
A. Discuss low pressure LPG	
B. Discuss the use and adjustment of the single stage LPG regulator	Students will install and adjust single stage LPG regulator for proper operation pressure
C. Discuss the use and adjustment of the double stage LPG regulator	Students will install and adjust double stage LPG regulator for proper operation pressure
D. Discuss the use and adjustment of an automatic change over regulator	Students will install and adjust an automatic change over regulator for proper operation of the LPG pressure
E. Discuss several LPG regulator problems associated with over filling and condensation	Students will clear LPG regulator from condensation

Unit VI - Filling the LPG System

SPECIFIC OBJECTIVES

1. Students will demonstrate their understanding of safe and hazardous conditions of filling a LPG cylinder.
2. Students will be able to safely fill a LPG cylinder using various methods.

TOPICS

A. Filling safety
B. Portable cylinder filling
C. Mounted cylinder filling

Classroom	Activities
A. Discuss the safety rules for LPG filling 1. No open flame of any kind 2. Operating of machinery in filling area is prohibited 3. Filling area must be locked to prevent tampering with equipment 4. No combustible materials in filling area 5. Fill tank must have 360° clear access 6. Safety equipment 7. Safety cylinders	Students will inspect for safe and hazardous tanke and filling conditions
B. Explain several methods of filling vertical and horizontal cylinders 1. Weight 2. Volume 3. Percentage 4. Explain mathmatical calculations for each capacity	Students will fill cylinders by several methods using safety precautions

C. Explain the method for filling a mounted cylinder

Students will fill a mounted cylinder in a safe manner

1. Volume

2. Percentage

Unit VII - Replacement of POL Valve from a Vertical Cylinder

SPECIFIC OBJECTIVES

1. Students will be able to prepare POL valve removal tools.
2. Students will be able to drain a LPG cylinder safely.
3. Students will be able to remove and replace a POL valve in a LPG cylinder.
4. Students will demonstrate their understanding of safety regarding the replacement of the POL valve.

TOPICS

A. Removal Tool Assembly
B. Tank Draining
C. Valve Replacement Safety
D. Tank Corrosion
E. Using Pipe Thread Sealing Materials

Classroom	Activities
A. Explain the assembly of the valve removal tools	Students will assemble POL valve removal tools
B. Discuss the proper methods of draining the LPG cylinder	Students will properly drain the LPG cylinder
C. Explain the proper method of removing and replaceing a POL valve in a LPG cylinder safely	Students will remove and replace a POL valve demonstrating safety and use of the proper tools
D. Discuss corrosion and how it can effect tank safety	Students will inspect the interior conditions of tank and remove any foreign matter from inside
E. Discuss the use of sealing materials on pipe threads	Students will place a sealing material in valve thread and replace valve in threads, tightening with proper tools
F. Explain need for leak testing prior to filling the cylinder	Students will test cylinder for leaks after partial filling, if in working order complet filling

HITCHING AND TOWING AIDS COMPONENT

Unit I Types of Hitches

Unit II Class I and II Hitches

Unit III Class III Hitches

Unit IV Sway Controls

Unit V Class I and II Wiring

Unit IV Class III Wiring

HITCHING AND TOWING AIDS COMPONENT OBJECTIVES

1. Students will be able to describe the Recreation Vehicle hitches and their installation commonly use in the industry.

2. Students will be able to select and install the proper Class I and II hitches.

3. Students will be able to select and install the proper Class III hitches and its components.

4. Students will be to select and install the proper sway control for a given trailer and tow vehicle.

5. Students will demonstrate their ability and understanding to install Class I and II wiring.

6. Students will demonstrate their ability and understanding to install a complete Class III wiring with a hydraulic brake controller.

Unit I - Types of Hitches

SPECIFIC OBJECTIVES

1. Students will demonstrate their understanding of safe hitches and safe hitch installation.
2. Students will demonstrate their understanding of the classifications of hitches.
3. Students will be able to calculate proper hitch classification given weigh rating for trailers and tow vehicles.
4. Students will demonstrate their understanding of the correct method of installing a hitch.
5. Students will be able to calculate tongue weight by use of a simple scale.

TOPICS

A. Safe Hitches
B. Hitch Classifications
C. Weld On
D. Bolt On
E. Tongue Weight

Classroom	Activities
A. Explain and discuss safe hitches and their installations	Students will inspect the construction and installation of several hitches Students will identify several safety points to be aware of on a hitch
B. Explain the need of several classifications of hitches	Students will examine the several diffrent classifications of hitches
C. Calculate and discuss the several weight ratings for trailers and tow vehicles to determine hitch classification	Students will calculate to determine the correct hitch for various uses
D. Discuss and explain the weld on hitch	Students will attend the designing and fabrication of a weld on tow platform
E. Discuss and explain the bolt on hitch	Students will attend the installation of a bolt on hitch platform

F. Explain and discuss tongue weight

G. Discuss methods of determining tongue weight

Students will calculate tongue wieght by use of a simple scale

Unit II - Class I and II Hitches

SPECIFIC OBJECTIVES

1. Students will be able to select a hitch when given vheicle make and model of tow vehicle.
2. Students will be able to safely prepare and install a Class I and II hitch on a tow vehicle.

TOPICS

A. Hitch Description
B. Installation

Classroom	Activities
A. Discuss and explain selecting the correct hitch for its intended use	Students will select the proper hitch for its intended use
B. Discuss and explain the installation of the Class I and II hitch	Students will install a Class I and II hitch
1. Discuss the safety of hitch installation	
2. Emphasize safety and care of a power drill when using to install hitch	
3. Discuss necessity of bolt torque when installing the hitch	

Unit III - Class III Hitches

SPECIFIC OBJECTIVES

1. Students will demonstrate their understanding of the principles used by the Class III equalizing bitch.
2. Students will be able to install a Class III bolt on hitch.
3. Students will be able to prepare a hitch head for welding.
4. Students will be able to adjust a bolt on hitch head for the proper hitch height.
5. Students will understand and be able to install an equalizing bar to a tow vehicle and trailer with proper weight distribution.

TOPICS

A. Class III Operation
B. Installation of Class III
C. Hitch Head
D. Equalizing Bar

Classroom	Activities
A. Explain and discuss the need for the Class III hitch	
B. Discuss the operation of the Class III hitch	
C. Discuss the calculations for determining the proper hitch for both tow vehicle and trailer	Students will calculate the proper hitch for the proper tow vehicle and trailer
D. Explain and discuss the correct installation of a Class III hitch	Students will install a Class III bolt on hitch
E. Emphasize installation safety	
F. Discuss proper drilling techniques	
G. Emphasize use of proper tools for a job	
H. Discuss the hitch head and its use	

I. Discuss marking the bolt on head in preparation of woelding for hitch height and head angle	Students will mark and prepare a weld on head Students will visit a welding shop and watch the weld on head being assembled
J. Discuss the use and advantages of the bolt on hitch head	Students will adjust a bolt on hitch head for proper hitch height and angle
K. Illustrate and discuss the adjustment for a bolt on hitch head	
L. Discuss and explain the use and operation of the equalizing bars	Students will assemble model hitching system
M. Discuss the proper load limit to determine proper arms for the hitch	Students will install equalizing bars to a tow vehicle and trailer with the proper weight distribution necessary
N. Discuss proper alignment of the equalizing bar mechanism	

Unit IV - Sway Controls

SPECIFIC OBJECTIVES

1. Students will demonstrate their understanding of a friction sway control.
2. Students will be able to install a friction sway control.
3. Students will be able to properly maintain a friction sway control.
4. Students will demonstrate their understanding of the equalizing bar sway control.
5. Students will be able to install an equalizing bar sway control.
6. Students will be able to maintain an equalizing bar sway control
7. Students will demonstrate their understanding of an electronic sway control.

TOPICS

A. Friction Sway Control
B. Equalizing Bar Swar Control
C. Electronic Sway Control

Classroom	Activities
A. Discuss the operation of the friction sway controls	
1. Explain its use in relations to other forms of sway controls	
2. Discuss the installation of the friction sway control	Students will install a friction type of sway control
3. Instruct students in the proper maintenance of the friction sway control	Students will maintain a friction sway control
B. Discuss the operation of the equalizing bar sway control	
1. Explain its use in relation to other forms of sway control	
2. Discuss the installation of the equalizing bar sway control	Students will install an equalizing bar sway control
3. Instruct the students in the proper maintenance of the equalizing bar sway control	Students will maintain an equalizing bar sway control

C. Discuss the operation of the electronic sway control

1. Discuss the installation of the electronic sway control	Students will wire a simulated electronic sway control
2. Discuss the proper on the road testing for the electronic sway control	Students will road test an electronic sway control

Unit V - Class I and II Wiring

SPECIFIC OBJECTIVES

1. Students will be able to select the proper material for Class I and II wiring.
2. Students will be able to make several wire connections commonly used by the Recreational Vehicle Industry.
3. Students will be able to take the necessary steps to wire a tow vehicle for a Class I or II wiring.

TOPICS

A. Selecting Wire
B. Selecting Connectors
C. Selecting Proper Circuits

Classroom	Activities
A. Discuss the gauging of wire	Students will examine several gauges of wire
1. Identify the proper wires used in Class I and II wiring	
2. Explain the proper use of the wire strippers	Students will strip various gauges of wire
B. Discuss the need for the several types of wire connectors used in the RV Industry	Students will examine several wire connectors common to the RV Industry
1. Explain the proper use of several wire connecting methods	Students will connect wire by several of the common methods used in the RV Industry
C. Discuss the proper method of probing for the towing light circuit	Students will probe for and connect the proper towing light circuits

Unit VI - Class III Wiring

SPECIFIC OBJECTIVES

1. Students will be able to select the proper imbilical connection for the intended use.
2. Students will be able to install a hydraulic brake controller.
3. Students will be able to install the battery feed line to the trailer properly.
4. Students will be able to install the proper imbilical connector.

TOPICS

A. Class III Wiring
B. Battery Wiring
C. Brake Controller Installation

Classroom	Activities
A. Discuss the wiring of the Class III wiring harness	Students will make a simple Class III wiring without imbilical connector
1. Discuss the selection of a proper imbilical connector for the tow vehicle and the trailer	Students will select a proper imbilical connector for the tow vehicle and the trailer
B. Explain the wiring necessary in order to feed the recreational vehicle from the tow vehicle with 12 volt	Students will run the necessary wire from the tow vehicle to the imbilical connector
1. Discuss the use of a fused link in the battery charge line	
2. Explain the necessity of using the proper wire for the job	
C. Discuss the proper installation of a brake controller	
1. Discuss the connection to the brake line	
2. Explain the proper method of installing the master cylinder brake tee	Students will install a brake tee

3.	Discuss the mounting of the brake control on the dash of the vehicle	Students will mount the brake control
4.	Discuss the wiring necessary to complete a working brake control	Students will wire the brake controller properly
5.	Explain the process of connecting all the feeding wires to a large imbilical connector	Students will make all the connections necessary to complete the Class III wiring

RUNNING GEAR COMPONENT

Unit I	Suspension System
Unit II	Axles, Wheels and Hubs
Unit III	Brakes
Unit IV	Wheels and Tires

RUNNING GEAR COMPONENT OBJECTIVES

1. Students will demonstrate their understanding and ability to repair various Recreational Vehicles suspension systems.

2. Students will be able to remove, pack, replace, and adjust wheel bearings.

3. Students will demonstrate their understanding and ability to repair several common brake systems in Recreational Vehicles.

4. Students will demonstrate their understanding of several tire wear problems and the correction.

Unit I - Suspension System

SPECIFIC OBJECTIVES

1. Students will be able to remove and replace a leaf spring on a Recreational Vehicle.
2. Students will be able to remove and replace a moryde suspension block on a Recreational Vehicle.
3. Students will be able to test, remove, and replace an air bag suspension on a Recreational Vehicle.

TOPICS

A. Leaf Springs
B. Moryde
C. Air Bag Suspension

Classroom	Activities
A. Explain and discuss the necessity of a good suspension system	
B. Explain the operation of the leaf sprin type suspension	
1. Discuss the removal and replacement of the leaf spring suspension	Students will remove and replace a leaf spring on a RV
C. Explain the operation of the moryde type suspension system	
1. Discuss the removal and replacement of the moryde suspension block	Students will remove and replace a moryde suspension block
D. Explain the use of the air bag suspension	
1. Discuss the removal of the bag type suspension	Students will remove and replace an air bag suspension

2.	Discuss the troubleshooting of the air pressure system in the air bag suspension system	Students will leak test an air bag suspension and correct any air leak found

Unit II - Axles, Wheels, and Hubs

SPECIFIC OBJECTIVES

1. Students will be able to remove a straight axle from a light camping trailer.
2. Students will be able to remove, clean, and repack the complete wheel bearing on a travel trailer.
3. Students will be able to adjust the travel trailer wheel bearings for proper tightness.

TOPICS

A. Axles
B. Bearings
C. Wheels

Classroom	Activities
A. Discuss the manufacture of several types of axles	
1. Discuss the axle removal on the camping trailer	Students will remove a straight axle from a light camping trailer
2. Discuss the detection of axle wear	
B. Discuss and explain the removal, cleaning and packing of inner and outer wheel bearings	Students will remove, clean, and repack the complete wheel bearing
1. Discuss the necessity of proper wheel bearing lubrication	
2. Discuss the detection of bearing wear	
3. Discuss the necessity for proper tightening of wheel bearings	Students will adjust wheel bearings for proper tightness
C. Explain and discuss the need for cleanliness when working with wheel bearings	

Unit III - Brakes

SPECIFIC OBJECTIVES

1. Students will be able to trouble shoot a surge brake.
2. Students will be able to replace an electromagnet.
3. Students will be able to replace the lining on a simple electromagnet brake.
4. Students will be able to adjust the brake lining on a travel trailer.
5. Students will be able to explain the working process of the disc brakes.

TOPICS

A. Surge Brakes
B. Electric Brakes
C. Disc Brakes

Classroom	Activities
A. Discuss several methods of braking a towed vehicle	
B. Explain the workings of a surge brake system	
C. Discuss common problems associated with surge brake system	Students will remove the inspection cover on a surge brake Students will inspect the fluid level of the brake master sylinder
D. Explain the use of correct tool for a proper job	
E. Discuss the operation of trailer electric brakes	Students will identify the major electric brake components
F. Explain how the electromagnet brake functions	Students will build a simple electromagnet
G. Discuss and identify wear areas of electronic brakes	Students will replace an electromagnet
H. Explain and discuss the replacement of brake lining on a trailer electric brake system	Students will replace the lining on a simple electronic brake

I. Explain and discuss the need for brake adjustment	Students will adjust the brakes on a travel trailer
J. Discuss and explain the workings of the hydraulic drum brakes	
K. Explain the removal of the wheel cylinder in a hydraulic drum brake	Students will remove and replace a hydraulic brake whell cylinder
L. Discuss the necessity for bleeding the brake line of air	Students will bleed the brake line of air
M. Discuss the replacement of brake lining	
N. Discuss the operation of the disc brake and identify the major components	Students will explain the operation process of disc brakes Students will examine a disc brake and label the major components

Unit IV - Wheels and Tires

SPECIFIC OBJECTIVES

1. Students will demonstrate their understanding of problems related to improper tire alignment.
2. Students will be able to static balance a tire.
3. Students will be able to mount an automotive tire by machine.

TOPICS

A. Types of Tires
B. Parts of the Tire
C. Tire Wear
D. Tire Changing

Classroom	Activities
A. Discuss the several styles of tires and their reasons for the design	Students will examine several tires and identify the several types
B. Discuss the parts of the automotive tire	
C. Discuss tire wear and explain how wear can illustrate faulty alignment	Students will check several vehicles to determine certain obvious tire alignment problems
D. Discuss tire air pressure, the life and automotive safety	Students will check several vehicles to determine tire pressure problems
E. Discuss tire balance and illustrate a static tire balancing	Students will static tire balance
F. Demonstrate the use of the tire changing machine	Students will safely mount a tire on a rim by use of the tire changing machine
1. Emphasize the safety of using correct tools and proper tires and rims	
2. Discuss inflation and over inflation of the auto tire	Students will check tires for proper air pressure and adjust if necessary

ELECTRICAL COMPONENT

Unit I Low Voltage

Unit II The Battery

Unit III The Power Convertor

Unit IV Domestic AC Voltage

ELECTRICAL COMPONENT OBJECTIVES

1. Students will demonstrate their understanding of low voltage.

2. Students will demonstrate their understanding and ability to maintain the common 12 volt automotive battery.

3. Students will demonstrate their understanding and abitlity to trouble shoot the Recreational Vehicle convertor.

4. Students will demonstrate their understanding of domestic AC and the RVIA standards for 110 volt electricity.

Unit I - Low Voltage

SPECIFIC OBJECTIVES

1. Students will demonstrate their understanding of basic electricity.
2. Students will be able to read simple 12 volt schematic symbols.
3. Students will be able to splice a simple 12 volt circuit by various methods.
4. Students will be able to preform several functions when using 12 volt multi-meter.

TOPICS

A. Common Terms
B. Use of a Mulit-meter
C. Reading Schematics

Classroom	Activities
A. Discuss basic low voltage	
B. Define and discuss common electrical terms 1. volt 2. amps 3. watts 4. ohms	
C. Explain methods of splicing a low voltage DC circuit	Students will build a simple 12 volt circuit
D. Explain the use of common schematic symbols	Students will read and describe common 12 volt schematic symbols
E. Explain and discuss the use of an electrical multi-meter	Students will test a simple 12 volt circuit with a multi-meter

Unit II - The Battery

SPECIFIC OBJECTIVES

1. Students will demonstrate their understanding of an automotive battery.
2. Students will be able to clean and protect the battery terminals.
3. Students will be able to fill and test an automotive battery.

TOPICS

A. Battery
B. Electrolyte
C. Battery Maintenance

Classroom	Activities
A. Explain and discuss the use of the battery emphasizing the 12 volt automotive battery	Students will examine the parts of an automotive type battery
B. Discuss the need for an electrolyte fluid in the automotive type battery	
C. Discuss the sulfation and the normal wear of the automotive battery	Students will examine an old battery to identify wear which has occured
D. Discuss the loss in power due to poor electrical connections and excessive corrosion	Students will clean and coat terminals with non-corrosive
E. Discuss the methods of corrosion elemination and prevention	
F. Discuss filling of a dry automotive battery	Students will fill a dry automotive battery
G. Discuss testing an automotive battery by specific gravity with hydrometer	Students will test for specific gravity by use of the hydrometer

Unit III - Power Convertor

SPECIFIC OBJECTIVES

1. Students will demonstrate their understanding and ability to identify the working parts of the power convertor.
2. Students will be able to trouble shoot a common Recreational Vehicle convertor problems.

TOPICS

A. 110 Volt Power
B. 12 Volt Power
C. Battery Charger
D. Charging While Driving

Classroom	Activities
A. Discuss the operation of a power convertor	Students will becom familiar with common parts of a power convertor
B. Discuss common terms associated with a power convertor	
C. Discuss the operation of the 110 AC system	Students will remove the cover of a convertor and describe the major components and their functions
D. Discuss the workings of the transformer and how it serves the RV system	Students will identify the auto relay transfer
E. Discuss how the convertor charger operates on 12 volt battery power	Students will explain how the auto relay preforms its function to allow a battery to be connected and disconnected from the RV system
F. Explain and discuss the ways a RV battery can be charge by the RV system	
G. Discuss several common convertor troubleshooting problems and the proper sequence of repair	Students will remove and replace a charging circuit modular board

Unit IV - Domestic AC Voltage

SPECIFIC OBJECTIVES

1. Students will be able to build a working 110 AC circuit.
2. Students will be able to test several receptacles for correct wiring.
3. Students will be able to install a circuit braker in a Recreational Vehicle electrical system.
4. Students will demonstrate their understanding on the RVIA standards for 110 AC electricity.

TOPICS

A. 110 AC Voltage
B. Types of Circuits
C. Switches and Receptacles
D. Common 110 AC Markings

Classroom	Activities
A. Discuss and explain 110 domestic AC voltage	Students will build a working 110 Volt circuit
B. Types of circuits 1. parallel 2. series 3. combination	
C. Explain proper methods of connecting wires and receptacles in the RV system	
D. Explain the need for proper grounding	Students will examine several switch receptacles to check for correct wiring
E. Explain and discuss the need for overcurrent protection devises	Students will install a circuit braker in the RV electrical system
F. Explain and describe the use of several common receptacles and caps used in electrical enterance	Students will examine several receptacles and caps used in electrical enterances

G. Discuss RVIA standards for 110 electricity

PLUMBING COMPONENT

Unit I	Plumbing Joints
Unit II	Plumbing Valves
Unit III	Fresh Water System
Unit IV	Drainage System
Unit V	Toilet System
Unit VI	Winterization
Unit VII	Monitoring Devices

PLUMBING COMPONENT OBJECTIVES

1. Students will be able to fabricate the joints commonly used in the maintenance of Recreational Vehicles.

2. Students will be able to diagnose valve problems and repair faulty valves.

3. Students will demonstrate their understanding of fresh water systems and their maintenance.

4. Students will demonstrate their understanding of drainage problems and their repair.

5. Students will demonstrate their understanding of the modern Recreational Vehicle toilet system and their repair.

6. Students will be able to winterize a typical Recreational Vehicle plumbing system.

7. Students will demonstrate their understanding of common monitoring devises, their installation and repair.

Unit I - Plumbing Joints

SPECIFIC OBJECTIVES

1. Students will demonstrate their understanding of the use of solder as a joint method.
2. Sthdents will be able to use the proper tools in a safe manner.
3. Students will demonstrate their understanding of the importance of flaring copper.
4. Students will demonstrate their ability to flare copper.
5. Students will be able to inspect flared copper joints.
6. Students will make compression type joints.
7. Students will be able to make plastic pipe, rigid pipe, vinyl tube, and vinyl tube to copper connections.

TOPICS

A. Soft Soldering Copper
B. Flaring Copper
C. Compression Connections
D. Cementing Connections
E. Vinyl Tube Connections
F. Vinyl Tube to Copper Connections

Classroom	Activities
A. Soft Soldering Copper	
1. Explain and discuss need for flux while soldering	Students will preform a clean secure soft solder joint.
2. Discuss the use of solder as bonding material	Students will dismantle a soft solder joint
3. Discribe and show the proper use and care of a torch outfit	
4. Discuss the use of:	
a. flint lighter	
b. LP tank	
c. sand or crocus cloth	
d. solder brush	

B. Flaring Copper

1. Discuss need for flare and double flare

   a. cutting and cleaning

   b. chosing fitting

   c. flaring of tubing

   d. inspecting of flare

   e. making the connection

2. Explain the proper care of the flaring tools

3. Discuss the use of correct tools for job

Students will prepare a joint and make a proper connection

Students will make a proper double flare connection

Students will cut tubing with pipe cutter

C. Compression Fittings

1. Discuss the operation and use of compression type joints

2. Explain proper fabrication of compression fittings

3. Discuss new methods of making compression fittings used by the RV Industry

Students will construct a proper compression fitting on copper tubing

Students will construct a compression joint using plastic compression

D. Cementing Connections

1. Explain use of plastic pipe

2. Discuss cutting and cleaning of rigid type pipe

3. Explain cementing of rigid type plumbing

Students will cut, clear, and cement a rigid plastic pipe joint

E. Vinyl Tube Connections

1. Explain the use of vinyl tubing used in the RV and how the system is constructed

Students will cut and connect properly vinyl tubing as a fresh water system

F. Vinyl TUbe to Copper Connections

1. Explain and discuss the use of vinyl tubing as a patch

2. Discuss and explain proper tools used when making a vinyl patch

Students will join a broken water system with the use of vinyl patching materials

Unit II - Plumbing Valves

SPECIFIC OBJECTIVES

1. Students will be able to identify sink, faucet, shut-off, slide, and check valves.
2. Students will be able to describe how each type of plumbing valve works.
3. Students will be able to disassemble and reassemble each type of plumbing valve.
4. Students will be able to diagnose valve problems.
5. Students will be able to repair faulty valves.
6. Students will be able to replace check valves.

TOPICS

A. Types of Valves

Classroom	Activities
A. Types of Valves	
1. Explain and discuss the operations of several plumbing valves	Students will diagnose and repair several plumbing valve problems
a. Discuss the diagnoses, disassembly, repair, and reassembly of the sink faucet valve	
b. Discuss the diagnoses, disassembly, repair, and reassembly of the shut off valves	
c. Discuss the diagnoses, disassembly, repair, and reassembly of the slide valves	
d. Explain need and check valve operation	
(1) discuss the diagnoses, disassembly, repair, and reassembly of the check valve	
(2) discuss repair of a city water intake valve	Students will repair and replace check valve in a city water fill

Unit III - Fresh Water System

SPECIFIC OBJECTIVES

1. Students will demonstrate their understanding of the operation of the demand water system.
2. Students will demonstrate their understanding of the possible problems and the remedies of the demand water system.
3. Students will be able to repair a demand pump.
4. Students will understand how the pressure water system functions.
5. Students will demonstrate their understanding of the possible problems and remedies of the pressure water system.
6. Students will be able to repair a simple compressor problem.

TOPICS

A. The Demand System
B. The Demand Pump
C. The Pressure System
D. The Compressor

Classroom	Activities
A. Explain the operations of the demand water system	Students will assemble a demand water system for a typical RV
B. Discuss the demand water system problems and remedies	
C. Discuss and present the workings of several types of demand pumps	Students will disassemble, examine and reassemble a demand pump
D. Explain the operation of a pressure water system	Students will assemble a typical pressure water system
E. Discuss pressure water system problems and remedies	
F. Discuss the operation of the compressor	Students will disassemble, examine and reassemble compressor
G. Explain the use of a compressor check valve	

Unit IV - Drainage System

SPECIFIC OBJECTIVES

1. Students will demonstrate their understanding of a modern Recreational Vehicle drainage system.
2. Students will design a typical gray water system.
3. Students will design a typical septic water drainage system.
4. Students will build a working gray and septic water system.
5. Students will be able to make several repairs on a Recreational Vehicls drainage system.

TOPICS

A. Gray Water System
B. Septic System
C. Emptying the Systems

Classroom	Activities
A. Expalin the construction of the gray water system	Students will design a typical gray water system and construct a working model
1. Examine and discuss common gray water problems and their corrections	Students will make repairs on faulty drainage system
B. Explain the construction of the septic drainage system	Students will design and construct a typical septic drainage system
1. Discuss several common problems of the septic drainage system	Students will repair several typical plumbing problems related to the septic system
C. Discuss the methods of draining both septic and gray water systems	Students will drain the gray water and septic systems properly

Unit V - Toilet System

SPECIFIC OBJECTIVES

1. Students will demonstrate their understanding of the portable toilet.
2. Students will demonstrate their understanding of the mechanical seal toilet.
3. Students will demonstrate their understanding of the electrical chemical toilet.
4. Students will be able to repair the mechanical seal and electrical chemical toilet system.

TOPICS

A. Portable Toilets
B. Mechanical Seal Toilets
C. Electrical Chemical Toilets

Classroom	Activities
A. Portable Toilets	
1. Explain and discuss the operations of the modern portable toilet	Students will charge toilet storage tank and describe the mechanical functions of the toilet
2. Discuss common problems assco-ciated with portable toilets	
B. Mechanical Seal Toilets	
1. Explain and discuss the operations of the mechanical seal toilet	
2. Discuss the need for proper winterization of the ball valve	
3. Discuss the replacement of the ball valve	Students will replace the ball valve
4. Discuss the problems related to a non functioning mechanical seal valve	Students will remove a mechanical seal valve if necessary repair or replace
5. Discuss the need for residual water in the bowl	

C. Electrical Chemical Toilets

1. Discuss the need for an electrical chemical toilet	
2. Discuss the operation of an electrical chemical toilet	
3. Discuss the need for the proper fluid level of the electrical chemical toilet	Students will charge the electical chemical toilet for use
4. Discuss the removal of the electrical chemical pump motor, repair and replacement	Students will flush system and remove electrical motor, repair and replace Students will test and repalce timer switch
5. Explain and discuss common problems of dump slide valves	Students will clean, repair or replace a faulty or non functioning slide valve
6. Discuss the toilet floor flange and its seal	Students will mount a toilet on a floor flange with its proper seals

Unit VI - Winterization

SPECIFIC OBJECTIVES

1. Students will demonstrate their understanding of anti freeze.
2. Students will be able to drain and winterize a typical Recreational Vehicle water system.
3. Students will demonstrate their understanding of the use and installation of a hot water heater bypass.
4. Students will be able to install a hot water heater bypass.

TJPICS

A. Proper Anti Freeze
B. Draining the System
C. Hot Water Heater Bypass

Classroom	Activities
A. Discuss proper anti freeze liquids	
B. Draining the system	
1. Discuss areas in which plumbing must be winterized to prevent freeze ups	
2. Explain tank draining and line clearing	Students will drain a typical RV water tank and clear all lines of water
3. Discuss the winterization of the RV drainage system	Students will winterize properly the RV drainage system
C. Hot water heater bypass	
1. Discuss methods to bypass the hot water heater	Students will install hot water heater bypass kit
2. Discuss and explain the generally accepted methods of filling the water system with an anti freeze solution	Students will fill fresh water system with anti freeze solution

Unit VII - Monitoring Devises

SPECIFIC OBJECTIVES

1. Students will demonstrate their understanding of several methods of monitoring devises.
2. Students will be able to install a monitoring devise.
3. Students will be able to trouble shoot common Recreational Vehicle monitoring devises.

TOPICS

A. Probes
B. Monitoring Panels

Classroom	Activities
A. Discuss and explain the operation of several methods of tanke monitoring	Students will examine several tank monitoring installations
B. Discuss and explain the different types of tank probes	Students will examine the different types of tank probes
C. Explain the installation of monitoring devises on metal and plastic tanks	Students will install a working monitoring devise to monitor several tanks
D. Discuss troubleshooting of monitor panels	Students will calibrate a monitor panel

CONSTRUCTION COMPONENT

Unit I Restriction of Construction

Unit II Supporting Construction

Unit III Exterior Construction

CONSTRUCTION COMPONENT OBJECTIVES

1. Students wil demonstrate their understanding of Recreational Vehicle construction restrcitions.

2. Students will demonstrate their understanding of the supporting constructions used in the Recreational Vehicle Industry.

3. Students will demonstrate their understanding of the aluminum and fiberglass exterior construction types and their repair.

Unit I - Construction Restrictions

SPECIFIC OBJECTIVES

1. Students will demonstrate their understanding of Recreational Vehicle Construction Restrictions.

TOPICS

A. Weight
B. Economy
C. Aerodynamics
D. Codes

Classroom	Activities
A. Discuss the Gross Vehicle Weight Rating (GVWR) of many common chassis produced by leading manufacturers	
1. Discuss the size of tow vehicle in relation to the GVWR	
B. Discuss standards now acceptable for milage economy which effect Recreational Vehicles	
1. Discuss public awareness of milage economy	
C Discuss how the aerodynamics of a Recreational Vehicle can have an effect on stability and fuel consumption of a RV	Students will develop a simple display illustrating an effect of aerodynamics Students will analyse the use of the airfoil on a tow vehicle currently used by RV enthusiasts
D. Discuss the codes used by RVIA in the safe building of Recreational Vehicles	Students will examine code restrictions
1. Discuss state and Federal Codes concerning the building and selling of Recreational Vehicles	

Unit II - Supporting Construction

SPECIFIC OBJECTIVES

1. Students will be able to remove a damaged section of aluminum framing.
2. Students will be able to remove a damaged section of steel framing.
3. Students will demonstrate their understanding of the arc welding process.
4. Students will demonstrate their understanding of the oxy-acetylene welding and cutting process.
5. Students will be able to remove and replace a damaged section of wood framing.
6. Students will be able to safely use a pneumatic staple gun.

TOPICS

A. Aluminum
B. Steel
C. Wood
D. Foam and ply

Classroom	Activities
A. Explain the procedure used to remove and replace a section of aluminum framing	Students will cut out a damaged section of aluminum and replace it Students will visit a shop to observe aluminum arc welding
B. Explain the proper methods of repairing steel framing in a vehicle	Students will remove a damaged piece of steel and prepare a new replacement section
1. Discuss the fundamentals of arc welding	Students will visit a welding shop and observe the process of arc welding
2. Discuss the simple vocabulary of arc welding	
3. Discuss the safety of arc welding	
4. Discuss the process of oxy-acetylene welding	Students will visit a welding shop and observe the process of oxy-acetylene welding
5. Discuss the vocabulary of oxy-acetylene welding	
6. Discuss the oxy-acetylene metal cutting process	
C. Discuss the use of proper saws when removing a damaged supporting wood construction	Students will use the proper saw to remove a damaged supporting beam

1. Reemphasize the proper use of the table saw	Students will use the table saw to prepare a new wooden section
2. Discuss the use of the pneumatic staple gun used to replace damaged section of wall	Students will use the pneumatic staple gun to replace a wooden wall construction
D. Discuss the construction of the foam and ply wall, its advantages and disadvantages	Students will examine the foam and ply wall type of construction

Unit III - Exterior Construction

SPECIFIC OBJECTIVES

1. Students will be able to safely use a power screw driver, aviation shears, and pneumatic air nibbler.
2. Students will be able to remove and replace a damaged exterior aluminum panel.
3. Students will be able to make a simple repair on a damaged fiberglass panel.
4. Students will demonstrate his understanding of common spray equipment.
5. Students will be able to identify and describe the use of the various parts of a spray gun.
6. Students will be able to adjust a spray gun to produce a desired effect.
7. Students will be able to maintain spray equipment.
8. Students will demonstrate their understanding of mixing paint in preparation for spraying.
9. Students will be able to spray an aluminum panel.

TOPICS

A. Aluminum Panel
B. Fiberglass Panel
C. Spray Painting
D. Finishing Compound

Classroom	Activities
A. Discuss the properties of the aluminum panel	Students will examine a panel of prefinished aluminum
1. Discuss and explain the use of the power screw driver	Students will safely use the power screwdriver in the removal of an aluminum panel
2. Discuss and explain the use of aviation shears and the pneumatice air nibbler	Students will safely use aviation shears and the pneumatic air nibbler for cutting aluminum
3. Discuss and explain the measuring and marking of a replacement panel	Students will mark and cut to size a replacement panel
4. Discuss and explain the replacement of an aluminum panel	Students will replace the aluminum panel
B. Discuss the properties of a fiberglass panel	
1. Explain the proper method of preparing a fiberglass panel for a patch	Students will prepare a fiberglass panel for a patch

2. Discuss and explain the mixing and application of resins	
3. Discuss the application of fiberglass cloth to a damaged section	Students will mix and apply resin and fiberglass cloth to damaged areas
4. Discuss and explain the several types of sanding the fiberglass surface before the job has been completed	Students will use several methods of sanding in completion of a fiberglass repair
C. Discuss the equipment used in the spray painting trade	Students will examine several pieces of equipment used in the spray painting trade
1. Discuss the parts of the spray gun	Students will examine and identify various parts of the spray gun
2. Discuss how the spray process can be altered to achieve a desired effect	Students will visit a paint shop to examine various spray painting techniques
3. Discuss the need for proper maintenance of spray equipment	
4. Discuss the properties of paints and paint supplies used in a Recreational Vehicle Dealership	
5. Discuss and explain the mixing of paint	Students will prepare a proper paint mixture for a specified hob
6. Disucss the technique used to spray a panel of aluminum	Students will spray a panel of aluminum
7. Discuss the stpes in the proper care and maintenance of spray equipment	Students will clean a spray gun properly
D. Discuss and explain the use of several finishing materials such as rubbing compounds, polishing compounds, and waxes	Students will use several finishing materials to produce a desired result

APPLIANCE COMPONENT

Unit I	Domestic Refrigeration
Unit II	Absorbtion Refrigeration
Unit III	Roof Top Air Conditioning
Unit IV	Automotive Air Conditioning
Unit V	Furnaces
Unit VI	Stove Tops
Unit VII	Domestic Ovens
Unit VIII	Microwave Ovens
Unit IX	Hot Water Heaters

APPLIANCE COMPONENT OBJECTIVES

1. Students will demonstrate their understanding of the operation of a domestic refrigeration system.

2. Students will demonstrate their understanding of the operation of the absorption refrigeration system.

3. Students will demonstrate their understanding of the operation of the roof top air conditioner.

4. Students will demonstrate their understanding of the operation of the automotive air conditioner.

5. Students will demonstrate their understanding of the operation of the modern Recreational Vehicle furnace.

6. Students will demonstrate their understanding of the operation of the stove top.

7. Students will demonstrate their understanding of the operation of the oven.

8. Students will demonstrate their understanding of the operation of the microwave oven.

9. Students will demonstrate their understanding of the operation of the hot water heater.

Unit I - Domestic Refrigeration

SPECIFIC OBJECTIVES

1. Students will demonstrate their understanding of a domestic refrigeration system.
2. Students will be able to check a domestic refrigerator for an electrical source problem.

TOPICS

A. Operation
B. Component Identification
C. Testing

Classroom	Activitities
A. Discuss the operation of the domestic refrigeration	Students will examine an operating refrigerator
B. Identify and explain the major component and its function in the system	Students will identify the major component of the refrigeration system
C. Discuss the methods of checking for electrical problems associated with the domestic refrigerator	Students will check a domestic refrigerator for an electrical source problem

Unit II - Absorption Refrigeration

SPECIFIC OBJECTIVES

1. Students will demonstrate their understanding of the absorption refrigeration system.
2. Students will be able to trouble shoot the workings of an absorption unit by surface temperature testing.
3. Students will be able to clean a main burner and inspect a burner orifice.
4. Students will be able to remove and replace a thermocouple.
5. Students will be able to test the electrical system of the refrigerator by use of a volt meter.
6. Students will be able to remove and replace a heating element.
7. Students will be able to remove and replace a faulty thermostat.
8. Students will be able to remove and replace a faulty cooling unit.

TOPICS

A. Absorption Operation
B. LPG System
C. 110/12 Volt System
D. Replacement of Cooling Unit

Classroom	Activities
A. Explain the absorption operation	Students will examine a working absorption unit for the various temperatures of the cooling unit
B. LPG System	
1. Discuss the need for proper LPG pressure	Students will check for proper pressure
2. Discuss the need for cleaning the LPG system	Students will clean a main burner and inspect a burner oritice
3. Discuss the gas ignition system	
4. Discuss the thermocoupler	Students will remove the thermocoupler test and replace if necessary
C. 110/12 Volt Electrical System	
1. Discuss the theory of the electrical system	

2. Explain the method used to check a possible electric malfunction	Students will test the electrical system by use of a voltage meter
3. Discuss the method of testing an electrical heating element	Students will test, remove and replace a heating element
4. Discuss the function of the electric thermostat	Students will test, remove, and replace a faulty thermostat

D. Cooling Unit

1. Discuss the causes of a non-functional cooling unit	Students will identify possible problems of a non-functional cooling unit
2. Discuss the removal of a refrigerator from its mounting compartment in a RV	Students will remove a refrigerator from it place of mounting
3. Discuss the removal of the cooling unit	Students will remove a faulty cooling unit and replace it with a new one
4. Discuss possible remedies to correct non-functional cooling units	

Unit III - Roof Top Air COnditioning

SPECIFIC OBJECTIVES

1. Students will demonstrate their understanding of a roof top air conditioner.
2. Students will be able to preform periodic maintenance on a roof top air conditioner.
3. Students will be able to test a roof top air conditioner by several methods.

TOPICS

A. Air Conditioning Operation
B. Electrical System
C. Maintenance
D. Trouble Shooting
E. Preformance Testing

Classroom	Activities
A. Discuss the operation of the roof top air conditioner	Students will examine a roof top mounted air conditioner
1. Describe the function of several roof top air conditioners	
B. Explain the electrical system in a roof top air conditioner	Students will identify the major components of the roof top air conditioner
1. Explain the use of the meter to check any electrical problem the roof air conditioner may incur	Students will check electrical system at several areas by use of the electrical meters
2. Explain the symbols on an electrical schematic, describing the operations of the air conditioner	
C. Discuss the proper maintenance of the roof top air conditioner	Students will clean the filters, all the coils, lubricate the fan motor and check for secure installation
1. Describe the charging of the air conditioner	Students will visit an air conditioning shop to observe an evacuation and charging of the roof top unit

D. Discuss trouble shooting of the air conditioner	Students will describe several techniques in air conditioning trouble shooting
E. Describe the method of testing the air conditioner performance	Students will test for temperature drop

Unit VI - Automotive Air Conditioning

SPECIFIC OBJECTIVES

1. Students will demonstrate their understanding of the auto air conditioner.
2. Students will be able to test an auto air conditioner for its preformance,
3. Students will be able to evacuate an auto air conditioner system.
4. Students will be able to charge an auto air conditioning system.

TOPICS

A. Operation of Auto Air
B. Maintenance
C. Testing

Classroom	Activities
A. Discuss the operation of the automotive air conditioner in relation to the operation of the roof top unit	Students will examine several different styles of auto air conditioners
B. Maintenance of the automotive air conditioner	
1. Identify the components in the auto air conditioning system	Students will identify similarity between the several auto air conditioners
2. Describe several tel-tale signs of air conditioner problems and their remedies	Students will examine a non-functioning auto air system to detect a simple problem
3. Examine the adjustment and replacement of worn belts	Students will replace worn belts
4. Explain the use of air conditioning gauges	Students will install gauges on an auto air system
5. Identify the problems that could be analysed by installation of a set of air conditioning gauges	
6. Describe the evacuation of the automotive air conditioning system	Students will evacuate an automotive air conditioning system

7. Describe the charging of the automotive air conditioning system	Students will charge an automotive air conditioning system

C. Explain the methods of testing an automotive air conditioning system

Unit V - Furnace

SPECIFIC OBJECTIVES

1. Students will demonstrate their understanding of the modern Recreational Vehicle furnace.
2. Students will be able to clean a furnace main burner.
3. Students will be able to repair and replace a faulty furnace ignition system.
4. Students will be able to repalce a wall thermostat.

TOPICS

A. Furnace Operation
B. LPG System
C. Electric System
D. Safety

Classroom	Activities
A. Explain and demonstrate the operation of the modern furnace	Students will ignite a modern LPG furnace
B. Identify for the students several components and their functions of the LPG system	Students will label several of the LPG furnace components and describe their functions
1. Explain the cleaning of the burner	Students will clean a main burner
C. Explain the electrical system used by a modern LPG heater	Students will trace and explain the function of the electrical system
1. Explain several methods of igniting a modern LPG furnace	Students will describe the ignition process for the several types of modern LPG furnaces
	Students will replace or repair a faulty furnace ignition
2. Describe the testing of a wall thermostat	Students will test a wall thermostat
3. Explain the replacement of a wall thermostat	Students will replace a wall Thermostat

D. Reinforce safety precautions in handling LPG

Unit VI - Stove Top

SPECIFIC OBJECTIVES

1. Students will demonstrate their understanding of a stove top.
2. Students will be able to replace a faulty burner valve.
3. Students will be able to adjust the stove top pilot.

TOPICS

A. Stove Top Operation
B. Major Components
C. Leak Detection
D. Faulty Valves

Classroom	Activities
A. Discuss the operation of the LPG stove top	Students will ignite a stove top pilot
B. Explain the major components of the stove top	Students will examine and identify the major stove top components
C. Explain the methods of leak detection on the stove top	Students will leak test the stove top
D. Describe the replacement of a faulty valve in the stove top	Students will replace a faulty burner valve
E. Describe how to properly adjust a stove top pilot	Students will adjust a stove top pilot

Unit VII - Domestic Ovens

SPECIFIC OBJECTIVES

1. Students will demonstrate their understanding of the Recreational Vehicle oven.
2. Students will be able to replace a main burner orifice.
3. Students will be able to adjust an oven pilot light.

TOPICS

A. Oven Operation
B. Major Components
C. Maintenance

Classroom	Activities
A. Explain the operation of the oven	Students will ignite the oven pilot and burner
B. Describe the removal of the main burner orifice	Students will remove, examine, and replace a main burner orifice
C. Explain the adjustment of an oven pilot	Students will adjust an oven pilot light

Unit VIII - Microwave Ovens

SPECIFIC OBJECTIVES

1. Students will demonstrate their understanding of the microwave oven.
2. Students will be able to identify several possible problems associated with the microwave oven.
3. Students will be able to test a microwave oven for leakage of microwaves.

TOPICS

A. Operation
B. Maintenance
C. Testing

Classroom	Activities
A. Explain the operation of the microwave oven	Students will actually use a microwave oven to prepare food
B. Describe several common microwave oven problems	Students will visit a shop where work is being done on the microwave oven Students will clean the proper seals on the oven door Students will identify possible problems on a microwave oven
C. Describe the testing to determine microwave leakage	Students will test a microwave oven for the presents of leaking microwaves

Unit IX - Hot Water Heater

SPECIFIC OBJECTIVES

1. Students will demonstrate their understanding of a hot water heater.
2. Student will be able to replace a hot water heater control valve.
3. Students will be able to remove and replace the pilot and main burner.
4. Students will be able to test, remove and replace the thermostat.

TOPICS

A. Operation
B. Control Removal and Replacement
C. Cleaning Burners
D. Thermocouple Removal and Replacement

Classroom	Activities
A. Explain the operation of the hot water heater	Students will examine the components of a hot water heater Students will ignite and describe the operation of the hot water heater
B. Describe the proper method of replacing a hot water heater control valve	Students will replace a hot water heater control valve
C. Explain the removal and cleaning of the pilot and main burner orifice	Students will remove, clean, and replace the pilot and main burner orifice
1. Discuss several problems common in the hot water heater	
2. Discuss the proper adjustment of the hot water heater pilot	
3. Discuss the proper adjustment of the main burner	Students will adjust both the main burner and pilot burners for correct intensity
D. Explain the removal, testing and replacement of the thermocouple	Students will remove, test and replace the thermocouple

AUTOMOTIVE COMPONENT

Unit I The Engine

Unit II The Fuel System

Unit III The Ignition System

Unit IV The Cooling System

Unit V The Lubrication System

AUTOMOTIVE COMPONENT OBJECTIVES

1. Students will be able to identify and understand various automotive engine components.

2. Students will demonstrate their understanding and ability to maintain a typical fuel system.

3. Students will demonstrate their understanding and ability to maintain the major components of the ignition system.

4. Students will demonstrate their understanding and ability to maintain the major components of the cooling system.

5. Students will demonstrate their understanding and ability to maintain the major components of the lubrication system.

SPECIFIC OBJECTIVES

1. Students will be able to identify several major components and their function.
2. Students will be able to identify and demonstrate their understanding of the various strokes of the OTTO cycle.

TOPICS

A. Components and Styles
B. OTTO Cycle

Classroom	Activities
A. Components and styles	
1. Identify several major components of the typical automotive engine	Students will examine and identify several major automotive components
2. Discuss several styles of engines, their advantages and disadvantages	Students will identify major styles of automotive engines
B. Explain and discuss the OTTO cycle operation	Students will identify the various strokes of the OTTO cycle

Unit II - The Fuel System

SPECIFIC OBJECTIVES

1. Students will demonstrate their understanding of the major components of the fuel system.
2. Students will demonstrate their understanding of the operation of a carburetor.
3. Students will recognize the need for and will properly replace fuel and air filters.
4. Students will be able to remove, test, and replace a fuel pump.

TOPICS

A. Major Components
B. Fuel
C. System Maintenance

Classroom	Activities
A. Discuss major components of the fuel system	Students will identify and describe the function of the fuel system components
1. fuel tank	Students will draw the path taken by the fuel system
2. carburetor	
3. fuel pump	
4. fuel and air filters	
B. Discuss the fuel-air mixture need on the engine and how it is accomplished	Students will examine a carburetor
1. Discuss the need of a clean fuel supply	
2. Discuss how the modern fuel system solves the clean fuel problem	
C. Discuss the replacement of fuel and air filters	Students will remove and replace both a fuel and air filter

1.	Explain the proper maintenance schedule to replace the fuel system filters	
2.	Describe the removal, testing and replacement of a fuel pump	Students will examine the removal and replacement process of the fuel pump

Unit III - Ignition System

SPECIFIC OBJECTIVES

1. Students will demonstrate their understanding of the major components in the ignition system.
2. Students will be able to trace the electrical path of the ignition system.
3. Students will be able to recognize the need for and maintain the ignition system.

TOPICS

A. Major Components of the Ignition System
B. Ignition Process

Classroom	Activities
A. Discuss the major components of the ignition system	Students will examine the major parts of the ignition system
B. Discuss the route in which the electrical charge moves through the ignition system	Students will trace the path of the ignition system
1. Explain the periodic maintenance of the ignition system	Students will remove and replace ignition wires, gap plugs, clean and repalce points
2. Discuss the trouble shooting of the engine through analyzing spark plugs	Students will make a simple analysis by the use of tel-tale spark plug indicators
3. Discuss the loss of power due to poor connections and corrosion in the ignition system	

SPECIFIC OBJECTIVES

1. Students will be able to identify the major cooling system components and their functions.
2. Students will be able to test an anti freeze solution for its effectiveness.
3. Students will be able to discharge and fill the automotive cooling sytem properly.
4. Students will be able to remove and replace a cooling system thermostat.
5. Students will be able to remove, replace and tighten a fan belt.

TOPICS

A. Major Components
B. Maintenance

Classroom	Activities
A. Identify major components and their function in the cooling system	Students will examine the major cooling system components
B. Discuss the properties of modern automotive anti freeze	
1. Discuss the testing of anti freeze soultion	Students will test the effectiveness of an anti freeze solution
2. Discuss the discharging and filling of an automotive cooling system	Students will fill the automotive cooling system
3. Discuss the function of the engine thermostat	Students will remove and replace a thermostat
4. Discuss the problems caused by a worn fan belt	Students will remove, replace and tighten a fan belt
5. Discuss how radiator pressure can effect the cooling system operation	

Unit V - Lubrication System

SPECIFIC OBJECTIVES

1. Students will be able to identify the general classes of oil and describe their functions.
2. Students will be able to change an oil filter and crank case oil.
3. Students will be able to check lubrication system levels.
4. Students will be able to grease a vehicle.
5. Students will be able to remove and replace a grease fitting.

TOPICS

A. Friction
B. Oil
C. Greasing

Classroom	Activities
A. Discuss the meaning of friction and how it could be reduced	
B. Discuss methods used to lubricate engines	
1. Discuss the types of oil by ratings	Students will identify general classes of oil and describe their function
2. Discuss the intervals in which oil should be changed	
3. Discuss the function of the oil filter	
4. Discuss the change of oil filters	Students will change oil filter and crank case oil
5. Discuss the points in which the level of lubrication fluid should be checked	Students will check oil level in the transmission and rear end
C. Discuss the lubrication of the chassis	

1. Explain the use and filling of a grease gun	Students will grease a vehicle
2. Discuss the replacement of a grease fitting	Students will remove and replace a grease fitting

ACCESSORY INSTALLATION COMPONENT

Unit I	Roof Mounted Air Conditioner
Unit II	Automatic Rollup Awning
Unit III	Television Antenna

ACCESSORY INSTALLATION COMPONENT OBJECTIVES

1. Students will be able to install a roof top air conditioner according to the manufacturers specifications.

2. Students will be able to install an automatic rollup awning according to the manufacturers specifications.

3. Students will be able to install a RV television antenna according to the manufacturers specifications.

Unit I - Roof Mounted Air Conditioner

SPECIFIC OBJECTIVES

1. Students will be able to prepare the roof for the installation of the roof top air conditioner.
2. Students will be able to align and bolt a roof top air conditioner in its proper position.
3. Students will be able to wire and test an installed roof top air conditioner in the proper manner.

TOPICS

A. Roof Preparation
B. Unit Securing
C. Unit Wiring
D. Air Box Installation
E. Warrenties

Classroom	Activities
A. Discuss the preparation for installation of the roof top air conditioner	Students will remove vent from vehicles roof
1. Discuss the need of proper roof support	
2. Explain cleaning of the roof to encourage a weather lite seal	Students will clean the roof mounting area
B. Discuss the alignment of the air conditioner	
1. Discuss the bolting in position of the air conditioner	Students will align the unit and bolt it into position
2. Discuss the proper tightening of the mounting bolts	
C. Discuss the power wiring of the air conditioner	Students will wire and test the air conditioner in the proper manner

D. Discuss the installation of the air box to the interior of the coach	Students will install the air box
E. Discuss a typical air conditioner warrenty	

Unit II - Auotmatic Rollup Awning

SPECIFIC OBJECTIVES

1. Students will be able to measure a RV to determine size and placement of an auto rollup awning.
2. Students will be able to install an auto rollup awning in the proper manner.
3. Students will be able to lubricate and clean a rollup awning in the proper manner.

TOPICS

A. Measuring
B. Installation
C. Operation
D. Maintenance

Classroom	Activities
A. Discuss the proper manner to measure an auto rollup awning for a specific vehicle	Students will measure the proper area to be covered by an auto rollup awning
B. Discuss the mounting of a rollup awning according to the manufacturers instructions	Students will install an auto rollup awning using instructions from the manufacturer
C. Discuss the proper operation of the rollup awning	Students will operate and explain the operation of the rollup awning
D. Discuss the maintenance of the auto rollup awning	Students will lubricate and clean an auto rollup awning in the proper manner

Unit III - Television Antenna

SPECIFIC OBJECTIVES

1. Students will be able to select and install a television antenna on a recreational vehicle.
2. Students will be able to preform periodic maintenance on a RV television antenna.

TOPICS

A. Selecting An Antenna
B. Installation
C. Operation
D. Maintenance

Classroom	Activities
A. Discuss the several types of antennas commonly used in the RV Industry and how to select the proper antenna	Students will examine the several commonly used RV antennas
B. Discuss the method of installation recommended by the manufacturer 1. Discuss the several types of wires and cable used in the installation of the TV antenna	Students will install a TV antenna on a RV
C. Discuss the operation of a television antenna	Students will operate a television antenna properly
D. Discuss the periodic maintenance of a television antenna	Students will preform periodic maintneance on a RV television antenna

AUXILIARY POWER COMPONENT

Unit I - Auxiliary Power Operation

Unit II Maintenance

Unit III Proper Installation

AUXILIARY POWER COMPONENT OBJECTIVES

1. Students will demonstrate their understanding of the electrical operation of the auxiliary power generator.

2. Students will demonstrate their understanding for preventative maintenance on an auxiliary power generator.

3. Students will be able to select and install an auxiliary power generator for a specific use.

Unit I - Auxiliary Power Operation

SPECIFIC OBJECTIVES

1. Students will demonstrate their understanding of the auxiliary power generator.
2. Students will be able to identify the major components of the auxiliary power generator.
3. Students will be able to trace the flow of current through the auxiliary generator.

TOPICS

A. Need
B. Types
C. Electrical Operation

Classroom	Activities
A. Discuss the need of the auxiliary power unit	
B. Discuss the types of auxiliary power units	Students will examine the various types of power units and identify the differences
C. Discuss the electrical operation behind the auxiliary power generator	
1. Identify major components of the power generator	Students will identify the major components of the auxiliary power generator
2. Explain the ignition system of a typical auxiliary power generator	Students will trace the flow of current through the ignition system of the auxiliary power generator

SPECIFIC OBJECTIVES

1. Students will demonstrate their understanding of preventative maintenance on the auxiliary generator.
2. Students will be able to preform simple maintenance on an auxiliary generator.

TOPICS

A. Routine Maintenance
B. Preventative Maintenance

Classroom	Activities
A. Discuss the several points of routine auxiliary generator maintenance	Students will inspect the points of maintenance
B. Discuss the need of preventative maintenance on the auxiliary generator	Students will: 1. remove, gap and replace spark plugs 2. drain and refill crankcase 3. remove and replace air cleaner 4. remove and replace oil filter

Unit III - Proper Installation

SPECIFIC OBJECTIVES

1. Students will be able to select a proper auxiliary generator for an intended use.
2. Students will demonstrate their understanding of the proper installation technique for an auxiliary generator.

TOPICS

A. Selection of Unit
B. Installation

Classroom	Activities
A. Discuss selecting the correct power unit 1. purpose intended 2. wattage requirements	Students will calculate the need of a power unit for: 1. purpose 2. wattage
B. Discuss the proper installation technique 1. proper ventilation 2. proper bracing	Students will prepare an area which meets the requirements for proper auxiliary power installation

PRE-DELIVERY SERVICE COMPONENT

PRE-DELIVERY SERVICE COMPONENT OBJECTIVES

1. Students will be able to safely test all systems to insure the customer complete safety and satisfaction.

2. Students will be able to design a functional shop area to promote speedy and complete pre-delivery techniques.

3. Students will be able to design a test of checkout procedures to be used to encourage a complete checkout process.

SPECIFIC OBJECTIVES

1. Students will demonstrate their understanding of the recording of a visual inspection.
2. Students will be able to perform a safety inspection on a pre-delivery vehicle.
3. Students will demonstrate their understanding of keeping proper safety records when making a safety check.
4. Students will demonstrate their understanding and ability to develop a pre-delivery check out process list.
5. Students will demonstrate their understanding and ability to develop an organized shop plan for a pre-delivery check out area.
6. Students will demonstrate their understanding the need of a comprehensive pre-delivery check out.

TOPICS

A. Visual Inspection
B. Safety Inspection
C. Systems Inspection
D. Accessories Inspection

Classroom	Activities
A. Discuss the need and importance of a visual inspection	Students will visually inspect a vehicle to be delivered and report their findings
B. Discuss the process of safety inspection of a vehicle to be delivered	Students will perform a safety inspection on a pre-delivery vehicle
1. Discuss the proper records concerning safety check and there importance to the dealership and the consumer	Students will record their safety inspection findings
C. Discuss the order in which systems are checked	
1. Discuss the use of a pre-delivery check out sheet	Students will develop a pre-delivery check list that will minimize check out time

2. Discuss the need for an organized shop area	Students will develop an organized shop layout to minimize check out time
D. Discuss the inspection of accessory equipment	
1. Discuss the need for a comprehensive check out	

MANAGEMENT COMPONENT

Unit I	Dealership and Business Operation
Unit II	Sales Department
Unit III	Service Department
Unit IV	Getting a Job

MANAGEMENT COMPONENT OBJECTIVES

1. The student will understand the many functions of the modern Recreational Vehicle Dealership.

2. The student will understand the functions and responsibilities of the Sales Department.

3. The student will understand the functions and responsibilities of the Service Department.

4. The student will understand the proper methods of requesting an interview, applying for a job, and the attire and attitudes required for a successful interview.

Unit I - Dealership and Business Operation

SPECIFIC OBJECTIVES

1. Students will identify the many functions of the modern Recreational Vehicle Dealership.
2. Students will demonstrate their understanding of the Business Chain of Command.
3. Students will demonstrate their understanding of many common business terms.

TOPICS

A. Dealership Operation
B. Chaine of Command
C. Common Terms of the Business

Classroom	Activities
A. Discuss how the modern Recreational Vechile Dealership functions	
B. Discuss the Dealership Chain of Command	Students will draw a chart dealing with a Dealership Chain of Command
C. Explain the Common Business Terms	Students will identify each term
1. Profit and Loss	
2. Gross Income	
3. Discount	
4. Mark up	
5. Balance Sheet	
6. Inventories	
7. Overhead	
8. Depreciation	
9. Material Cost	
10. Inventory Turnover	
11. Insurance	
12. Taxes	

Unit II - Sales Department

SPECIFIC OBJECTIVES

1. Students will be able to identify the functions of the Sales Department.
2. Students will Demonstrate their understanding of the job of the Recreational Vehicle Salesperson.
3. Students will demonstrate their understanding of several types of commissions paid the sales staff and how those commissions are calculated.

TOPICS

A. Functions of the Sales Department
B. Responsibilities of the Sales Department
C. Wages of the Sales Department

Classroom	Activities
A. Discuss the functions of the Sales Department	
1. Discuss the need for good marketing of products	Students will develop a marketing project for a Recreational Vehicle
2. Discuss the annual cycle of Recreational Vehicle sales	
B. Discuss how the salesperson works and how he effects the dealership	Students will roll-play a salesperson to consumer relationship
1. Discuss the process of one to one selling	
2. Discuss the taking of the trade-in vehicle	Students will calculate the taking of a trade-in vehicle
3. Discuss the responsibilities of the sales person	
C. Discuss common wages paid to the sales department staff	
1. Explain how to calculate the wages of the sales staff	Students will calculate sales staff wages based on given sales information

Unit III - Service Department

SPECIFIC OBJECTIVES

1. Students will be able to identify the functions of the Service Department.
2. Students will understand how warrenty work is processed in the Service Department.
3. Students will be able to identify the range of wages paid the Service Department.

TOPICS

A. Functions of the Service Department
B. Responsibilities of the Service Department
C. Wages of the Service Department

Classroom	Activities
A. Discuss the many functions of the Service Department	Students will visit an operating Service Separtment and identify their functions
B. Discuss the functions of the people employed by the Service Department	Students will identify the various general responsibilities given members of the Service Department
1. Discuss the need of a reputable Service Department	
2. Discuss the handling of a consumer service problem	Students will role play solving a consumer service problem
3. Discuss the need for quick and correct analysis of a service problem	
4. Discuss the writing of the customer work order	Students will write up a work order given typical cutomer information
5. Discuss how warrenty work is processed	Students will examine and complete several warrenty claim forms with given information
C. Discuss the wages paid to the Service Department	

Unit IV - Getting the Job

SPECIFIC OBJECTIVES

1. Students will demonstrate their understanding of how to locate a job opening.
2. Students will be able to request a job interview in a proper manner.
3. Students will be able to fill out a job application in the proper manner.
4. Students will understand the need for proper attire and proper attitudes when being interviewed.

TOPICS

A. Job screening
B. Job Application
C. Job interview

Classroom	Activities
A. Discuss various places to look for a job in the Recreational Vehicle Industry	Students will search through local newspapers and trade journals for job openings
B. Discuss the completion of a job application	Students will complete a job application
C. Discuss requesting a job interview	Students will role play a request for a job interview
1. Discuss the proper attire for a successful job interview	Students will role play a job applicant and a job interviewer
2. Discuss the attitude necessary to best sell yourself	

DISSEMINATION

Within District

Information concerning the Recreational Vehicle Maintenance/Repair Program will be discussed monthly at instructional (teachers) level meetings held by the teacher responsible for the program. Similarly the Principal responsible for the building, in which the program will be developed, will report monthly major activities and significant concerns to the administrators attending the Superintendent's or Assistant Superintendent's staff meetings.

Outside of District

Public relations materials will be developed and distributed to vocational schools throughout the State of New Jersey to provide an awareness of the program. Newspaper articles in Monmouth, Ocean and Atlantic counties will highlight student involvement in a new program offered by Ocean County Vocational Technical School which is unique in terms of design and availability to high school students.

Last but not least, the interim curriculum guide will be amended and submitted to the New Jersey Curriculum Laboratory for publication. The permanent curriculum will be developed and submitted in July 1979.

Sex Bias and Sex Role Sterotyping

The Ocean County Vocational-Technical School has developed equal opportunity policies which are approved by the New Jersey State Department of Education regarding school and classroom practices. The policy stipulates that:

1. We will pursue policies of non discrimination based upon race, color, creed, sex, religion, social or economic status in regard to recruitment, evaluation of performance and placement of all students.
2. Textbooks and instructional materials will be used which are non-discriminatory.
3. Students will be placed in programs which they select.
4. Teacher assignments will be made on a non-discriminatory basis and in conformity with New Jersey State Department Bureau of Certification requirements.
5. Students will hav an equal opportunity to participate in all classroom and extra curricula activities.
6. Recruitment information presented to students prior to applying and being accepted in the vocational school shall be presented in a non-discriminatory manner.
7. An annual review of practices and policies shall be conducted and reported to the Board of Education.

Suggested Time Allotments

This curriculum was originally designed to be a one year program. After much discussion with the Advisory Committee concerning the volume of work to be covered they were convinced that to cover this work in its entirety a two year program would be advisable.

Since the Ocean County Vocational-Technical School has to make this initially a one year program, the course material has been divided into two parts.

The first seven components will be approximate for a one year program, a second year of the program would cover all fourteen components in its entirety.

Projected Hourly Schedual

1.	Orientation Component	60
2.	Tools and Equipment Component	60
3.	LPG System Componet	90
4.	Hitching and Towing Aids Component	90
5.	Running Gear Componet	60
6.	Electrical Component	90
7.	Plumbing Component	90
		540
8.	Construction Component	90
9.	Appliance Component	120
10.	Automotive Component	90
11.	Accessory Installation Component	90
12.	Auxiliary Power Component	60
13.	Pre-Delivery Service Component	60
14.	Management Component	30
		540

Those who adopt this program are strongly urged to develop a cooperative arrangement with industry to complement course work. In the following instances a cooperative experience would be especially desirable.

1. When the vocational school school lacks the facilities or pertinent equipment being studied. In this situation industry can substitute for the lack of educational facilities or lack of equipment. In this case an instructor should be assigned who is competently skilled and able to relate to the students in their working experience to a learning experience based on the content of the program.

2. When a student has reached a competent level of skill in a particular area prior to entering the program. This level of skill should be applied immediately in a job situation, instead of relearning known material in the classroom.

3. When the instructor desires to enrich a students instruction in a particular area.

Positioned properly in industry, a student could perform actual work under the conditions of business deadlines. In a business environment a student would also be exposed to the all important businessman-customer relationship.

The CIE program could augment the classroom instruction by stressing a particular component, a new process, or none contemporary equipment. CIE will provide an appraisal of students performance in a business atmosphere. Its assessment would help determine the strengths and weakness of the program.

The CIE stage of our program is a flexable tool to be used during a students

education when the student could profit more from it then from formal inschool work. In many cases it may open the door to a students opportunities upon the completion of this program.

Student Progress Chart

Because of the interdisciplinary nature of this program, recording a students achievements and competencies is necessary. Therefore, a progress chart has been developed.

The effectiveness of this chart is determined by the accuracy of the instructors ability to recognize the students ability to perform an assigned task properly and to meet the specific objectives which precede each component.

There are many advantages of maintaining a progress chart. It summarizes each students achievements. Rather than assign a grade in each unit the instructor could withhold his signature until the student could perform the work competently.

This chart can also provide an accurate educational profile for each student. Used as a transcript the student could provide potential employers with an accurate profile of an individuals performance in the program.

Student Progress Chart

Recreational Vehicle
Maintenance/Repair Program

Ocean County Vocational-Technical School

Student's Name _____

	Date Attained	Instructor's Signature
ORIENTATION COMPONENT		
1. Trade Understanding	_____	_____
2. Type Identification	_____	_____
3. Shop Safety	_____	_____
4. Personal Safety	_____	_____
5. Tool Safety	_____	_____
6. Accident Investigation	_____	_____
TOOL & EQUIPMENT COMPONENT		
1. Hand Tools	_____	_____
2. Power Hand Tools	_____	_____
3. Bench Tools	_____	_____
4. Common Fasteners	_____	_____
LPG COMPONENT		
1. Safety of LPG	_____	_____
2. LPG Operation	_____	_____
3. LPG System Testing	_____	_____
4. LPG System Assembly	_____	_____
5. LPG Regulation	_____	_____
6. LPG Filling	_____	_____
7. POL Replacement	_____	_____
HITCHING & TOWING AIDS COMPONENT		
1. Hitch Types & Purposes	_____	_____
2. Installation of Class I & II Hitches	_____	_____
3. Installation of Class III Hitch	_____	_____
4. Sway Control	_____	_____
5. Installtion of Class I & II Wiring	_____	_____
6. Installation of Class III Wiring	_____	_____
RUNNING GEAR COMPONENT		
1. Suspention System	_____	_____
2. Axles, Wheels & Hubs	_____	_____
3. Brakes	_____	_____
4. Wheels & Tires	_____	_____
ELECTRICAL COMPONENT		
1. Low Voltage	_____	_____
2. The Battery	_____	_____
3. The Power Convertor	_____	_____
4. Domestic AC Voltage	_____	_____

PLUMBING COMPONENT
1. Plumbing Joints
2. Plumbing Valves
3. Fresh Water System
4. Drainage System
5. Toilet System
6. Winterization
7. Monitoring Devices

CONSTRUCTION COMPONENT
1. Restrcition of Construction
2. Supporting Construction
3. Exterior Construction

APPLIANCE COMPONENT
1. Domestic Refrigeration
2. Absorption Refrigeration
3. Roof Top Air Conditioning
4. Automotive Air Conditioning
5. Furnaces
6. Stove Tops
7. Domestic Ovens
8. Microwave Ovens
9. Hot Water Heaters

AUTOMOTIVE COMPONENT
1. The Engine
2. The Fuel System
3. The Ignition System
4. The Cooling System
5. The Lubrication System

ACCESSORY INSTALLATION COMPONENT
1. Roof Mounted Air Conditioner
2. Automatic Rollup Awning
3. Television Antennas

AUXILIARY POWER COMPONENT
1. Auxiliary Power Operation
2. Maintenance
3. Proper Installation

PRE-DELIVERY SERVICE COMPONENT
1. Visual Inspection
2. Safety Inspection
3. System Inspection
4. Accessory Inspection

MANAGEMENT COMPONENT
1. Dealership and Business Operation
2. Sales Department
3. Service Department
4. Getting the Job

SUMMARY

1. After a trial period in Ocean County the program should be promoted in other parts of the state.

2. Recreational Vehicle Sales and Service owners throughout the state should be made aware of this program.

3. This program is originating as a one year program. However, there is considerable evidence that a two year program would be preferable. It is therefore recommended that after a satisfactory trial period this program be enlarged to two years.